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In the Supreme Court of the United States

OCTOBER TERM, 1976

76-1558

C. MARSHALL DANN, COMMISSIONER OF PATENTS AND TRADEMARKS, PETITIONER,

v.

A. MICHAEL NOLL

PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF CUSTOMS AND PATENT APPEALS

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The Solicitor General, on behalf of the Commissioner of Patents and Trademarks, petitions for a writ of certiorari to review the judgment of the United States Court of Customs and Patent Appeals in this case.[1]

OPINIONS BELOW

The opinion of the Court of Customs and Patent Appeals (App. A, *infra*, pp. 1A–24A) is reported at 545 F. 2d 141. The opinion of the Patent and Trademark Office Board of Appeals (App. C, *infra*, pp. 27A–33A) is not reported.

[1] A petition seeking review of a companion case decided by the same court, *Application of Chatfield*, 545 F. 2d 152, is being filed concurrently herewith.

JURISDICTION

The judgment of the Court of Customs and Patent Appeals (App. B, *infra*, p. 25A) was certified to the Commissioner of Patents on December 10, 1976. On March 8, 1977, the Chief Justice extended the time for filing this petition to May 9, 1977 "without prejudice to the Court's consideration of whether [the government's] application has been filed in time."[2] The jurisdiction of this Court is invoked under 28 U.S.C. 1256. *Gottschalk* v. *Benson*, 409 U.S. 63; *Dann* v. *Johnston*, 425 U.S. 219.

[2] The time for petitioning for review of the judgment should be computed from December 10, 1976. Under the practice of the Court of Customs and Patent Appeals, the only judgment issued by that court is its mandate. The court's opinion, entered November 18, 1976, is not entered on the court's docket as a judgment. The mandate, issued on December 10, 1976, implements the decision and constitutes the judgment of the court, in accordance with 35 U.S.C. 144, which provides: "the court shall return to the Commissioner [of Patents] a certificate of its proceedings and decisions, which shall be entered of record in the Patent Office and govern the further proceedings in the case." The clerk's office of the Court of Customs and Patent Appeals has advised us that mandates are not prepared at the time the court's decision is announced, but only shortly before the mandates are issued. Moreover, when this court reverses a judgment of the Court of Customs and Patent Appeals, that court does not, upon remand, withdraw its decision as if it were a judgment. Instead it simply issues a new mandate in conformity with this Court's determination. See *In the Matter of the Application of Thomas R. Johnston*, CCPA Patent Appeal No. 9088, mandate issued April 29, 1976, pursuant to *Dann* v. *Johnston*, 425 U.S. 219. While the former rules of the Court of Customs and Patent Appeals governing issuance of the mandate and petition for rehearing referred to "entry of judgment" (CCPA Rule 6.1), and to "the date of judgment" (CCPA Rule 6.2), this language, inconsistent with the court's actual practice, was deleted from the rules effective January 1, 1977, to substitute the word "decision" for "judgment" in those provisions. For purposes of determining the date of judgment, therefore, this case is analogous to *Commissioner* v. *Estate of Bedford*, 325 U.S. 283, 284–288, which held that in the light of then actual practice in the Second Circuit, time to petition for a writ of certiorari ran from the date of that court's "order for mandate", rather than from the date of the opinion recorded on the docket. Although certain language in the Second Circuit's rules concerning rehearing, issuance of mandate and stay of mandate permitted the argument that the decision was the appealable judgment, this Court held that "[i]n spite of its title, the 'Order for Mandate' on its face fulfills the function of such a judgment order." 325 U.S. at 286.

QUESTIONS PRESENTED

1. Whether a new computer program, unpatentable when claimed as a process or method for operating a conventional general-purpose digital computer, becomes patentable when claimed as a "machine" that is the conventional general-purpose digital computer under the direction of the new program.

2. Whether the subject matter patentable under 35 U.S.C. 101 includes computer programming for a conventional, general-purpose, digital computer system, when:

> (a) the claims' only limitation as to end use and apparatus is that the programming is for data-processing use in a conventional general-purpose digital computer system;
>
> (b) the applicant's only inventive contribution, if any, over the prior art is the concept of using computer-programming means, rather than wired apparatus, to convert data from one form to another; and

(c) the program implements the concept in a conventional manner.

CONSTITUTIONAL AND STATUTORY PROVISIONS INVOLVED

Article I, Section 8, clause 8, of the Constitution of the United States provides:

> The Congress shall have Power * * *
>
> * * * * *
>
> To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries * * *.

35 U.S.C. 101 provides:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

STATEMENT

Respondent, an employee of Bell Telephone Laboratories, applied (R. 5) [3] for a patent on a "Raster Scan Computer Graphics System" that displays numerical information or signals in graphic form on a television screen display device.[4] The system involves four major

[3] "R." refers to the printed record filed in the Court of Customs and Patent Appeals.

[4] Respondent recommends using the Honeywell DDP-224, a known general-purpose digital computer (App. A, *infra*, p. 3A; R. 11).

parts: (1) a general-purpose digital computer with the "usual complement" of data processing components (R. 11); (2) a raster-scan display device (such as a television tube);[5] (3) a "memory/display interface" device, which converts the digital signals that come from the computer into analog signals suitable for use in the TV-tube device; and (4) a computer program that controls the computer so that it performs "scan conversion."[6] The latter is a process that takes numerical data in one digital form and changes it into numerical data in another digital form that can be used to generate signals within the memory/display interface device for display on the TV tube.

Typically, a TV tube or other output display screen is composed of an array of dots or points arranged in horizontal rows and vertical columns (a so-called "matrix" or "dot-matrix"). When particular points on the screen are energized (such as by the electron beam in a TV tube), they "light up," like the illuminated points on a scoreboard or electric sign.

There are several ways to specify or designate each of the points in such a matrix to achieve a one-to-one correspondence between each point and each designation. One is to impose a rectangular grid of horizontal

[5] In a raster-scan display device, a substantially continuous electron beam scans a screen, selectively energizing certain points to produce the desired image. See App. A, *infra*, p. 1A; R. 8.

[6] Although the system "involves" these four parts, as it is explained in the patent application, the claims do not all involve all four parts. Thus, claims 9 and 10 do not mention parts (2) and (3), above. See App. A, *infra*, p. 7A.

and vertical lines (x and y coordinates) over the points. Another is to assign each point a unique "address," by counting off the points in order, row by row, starting from one corner. The first system (x-y or "point-plotting") is normally used by scientists and engineers to record and manipulate data. The second (sequential or "dot-matrix" format), however, is more convenient and economical for use in TV-tube display devices, because the electron beam of such a device scans the dot-matrix of a display screen in sequence, row by row.

Under respondent's program, the "scan conversion" from x-y format to sequential format is accomplished by assigning a unique number to each x-y pair by means of a simple mathematical formula.[7] The resulting number (the "address" or "scan matrix position") specifies a unique sequential position in a dot-matrix, which in turn corresponds to a unique sequential position on the display screen (see R. 51). This digital information is then transformed, by

[7] Specifically, respondent's formula is:

$$\text{Scan matrix position} = (240\,y + x)/24$$

where 240 equals the number of display points on each line (row) of the display (R. 22). A similar scan matrix position ("S.M.P.") formula can be used for a line with a different number of points. Such conversion of a point location specified in x-y form into a unique addressing location, defined by a function of x and y, is a conventional use of a conventional computer-programming technique. Respondent makes no claim that using this technique here involved any inventiveness. See R. 49.

means of a conventional digital-to-analog converter in the memory display interface device of the computer system being used (n. 4, *supra*, p. 4; R. 14), into electronic signals for display on the TV tube, "having the usual characteristics associated with signals supplied to commercial or other television receivers" (App. A, *infra*, p. 3A; R. 15).

The patent application states (R. 11–15), and the lower court observed, that all of the hardware (or physical components) used in the alleged invention is known (App. A, *infra*, p. 2A). Similarly, respondent expressly admitted in an amendment to his application (R. 49) that there is nothing new in the technique and concept of scan conversion that is accomplished here,[8] and that the detailed programming steps for accomplishing the conversion by a digital computer are "obvious to an ordinary skilled worker in the field."[9] The only novelty in the claimed invention is the accomplishment of scan conversion by digital computer program methods,

[8] See also R. 8–9.

[9] As the application explained (R. 34): "It is considered that the algorithms and other procedures described above [in the application specification] and illustrated in the accompanying block diagrams and flow charts are sufficiently disclosed to permit one of ordinary skill to practice the instant invention or so much of it as is of use to him."

Respondent stated further, in an amendment to his application, that "[t]here is nothing in the * * * description [of the scan conversion procedure] * * * which can not be implemented using straightforward, elementary (one might even say trivial) programming techniques" (R. 49).

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rather than by the hardware or wired apparatus that others previously used (R. 13, 52).[10]

The patent examiner rejected claims 2 and 7–10 (R. 60, 90)[11] which claim, as an "apparatus," a combination of "means" for performing the previously-described scan conversion and digital-to-analog conversion by use of a program-controlled general-purpose digital computer.[12]

On appeal, the Board of Appeals of the Patent and Trademark Office (the "Board") affirmed the rejections,[13] stating the ground for rejection involved in this petition: that the respondent's appealed claims, though "couched in apparatus form," were

[10] The examiner had initially rejected claim 1 (App. A, *infra*, p. 5A) "under 35 U.S.C. 102 as clearly anticipated by Fenimore" [a prior patent that disclosed a wired-circuitry apparatus for the same operations] (R. 44). Respondent did not deny this, but instead responded (R. 52) that "[i]t is considered sufficient to say by way of traversing this rejection that Fenimore does not show a 'programmable data processor operating under the control of a program to convert * * *'," and contended "[t]hus the flexibility of program control of the type described in the instant specification is absent in Fenimore." The examiner then allowed claim 1 (R. 60). Petitioner does not challenge the respondent's assertion that there was no prior use of a digital computer for the purpose of performing scan conversion.

[11] The examiner allowed respondent's claims 1, 4–6, and 11–13, which are not in issue here.

[12] The rejected claims are set out at R. 213–215.

[13] The Board lacks authority, under Patent Office procedures, to reject claims that the examiner has allowed. *Watson* v. *Bruns*, 239 F.2d 948 (C.A.D.C.). While the Board can now remand a case to the examiner for consideration of a possible rejection of an allowed claim [37 C.F.R. 1.196(d), effective March 1, 1977], it lacked such express authority when the appeal in this case was decided.

nonetheless claims for computer programs, so that the applicant sought a patent on nonstatutory subject matter, contrary to 35 U.S.C. 101 and *Gottschalk* v. *Benson*, 409 U.S. 63.[14] The Board held that the format (i.e., "process" or "machine") in which the patent draftsman presents computer program claims is "immaterial as to the legal effect" (App. C, *infra*, p. 31A, R. 110–111).

The Court of Customs and Patent Appeals reversed, 3-to-2, holding that this Court's decision in "*Benson* must be limited to method claims such as those presented by that case," and therefore it did not apply to respondent's computer programming claim in "apparatus" format (App. A, *infra*, p. 16A). Stating that the claimed patent "comprises physical structure, including storage devices and electrical components uniquely configured to perform specified functions through the physical properties of electrical circuits" (*id* at 14A), the court below held that respondent's "programmed machine is structurally different from a machine without that program" (*ibid.*), and thus is statutory subject matter under 35 U.S.C. 101.

[14] The examiner's rejection is not pertinent here. It was based upon allegedly inadequate disclosure under 35 U.S.C. 112. The examiner took final action on the application before this Court had handed down its decision reversing the decision of the Court of Customs and Patent Appeals in *Benson*, *supra*. The Board's rejection asserted a new and independent ground as patent office rules permit (37 C.F.R. 1.196(b)), although it also incorporated the examiner's remarks as to 35 U.S.C. 112 by reference (App. C, infra, pp. 30A–31A; R. 106–107).

Judge Lane, joined by Judge Rich, dissented on the ground that the *Benson* opinion must be given a broader reading—one of "general proscription on the patenting of computer programs" however drafted (App. A, *infra*, p. 22A). Judge Lane disagreed with the majority's "narrowly limiting *Benson* to method claims," which "would permit and invite circumvention of that decision by the facile drafting device of claiming in apparatus form an idea for programming computers * * * " (*id* at 23A).

REASONS FOR GRANTING THE WRIT

The decision of the Court of Customs and Patent Appeals and its companion decision, *Application of Chatfield*, 545 F.2d 152 (as to which a petition for certiorari is being concurrently filed), conflict both with the rationale of *Gottschalk* v. *Benson*, 409 U.S. 63, and with the well-recognized principle that ideas and mental concepts, however claimed and however useful, are not patentable. These decisions, resting on a strained interpretation of *Benson*, have created serious uncertainty and confusion in the administration of the patent laws.[15] Indeed, the recur-

[15] Indeed, the one point on which the majority and dissenting judges below agree is the need for this Court's resolution of this matter. In dissent in *Chatfield*, *supra*, Judge Rich spoke of the "urgent need to settle the question * * * by higher authority than this court so that the Patent and Trademark Office, the Federal judiciary as a whole, and the data-processing industry (hardware and software both) may know what the law on software patentability is" (545 F.2d at 161). In a footnote to the *Chatfield* majority opinion, Chief Judge Markey "join[ed] our brother Rich's scholarly call for definitive guidance by higher authority" (*id.* at 157, n. 6.).

rent problems that computer program cases pose for the Patent and Trademark Office so impair the effective administration of this aspect of the Office's statutory function that the Commissioner of Patents and Trademarks believes that some definitive determination of the circumstances, if any, in which patents should be allowed on computer programs is at least as important to the Office as the nature of the determination itself. To await infringement litigation to test the validity of this patent (and other such computer patents) would prolong the period of such uncertainty, at increased costs to industry, the public, and the Patent and Trademark Office. Moreover, if the decision below is allowed to stand, large numbers of patents for programs claiming new uses for general-purpose digital computers will have to be granted.[16] This could have a serious adverse effect on development of the computer industry[17] and on the use of

[16] The Patent and Trademark Office estimates that approximately 600 to 900 applications for computer programming patents are now pending, and that approximately 450 such applications are now filed each year.

[17] The 1972 receipts volume for computer programming and other software services, defined as "establishments primarily engaged in providing services in computer programming, systems design and analysis, and other computer 'software'" (*Standard Industrial Classification Manual* (1972)), was almost $1 billion, out of a total data-processing services volume of $3.4 billion. United States Department of Commerce, *U.S. Service Industries in World Markets: Current Problems and Future Policy Development* A–96 (December 1976). This nearly $1 billion figure is exclusive of the software services that integrated electronic computer manufacturers provide in conjunction with their computer sys-

computer technology, and of other graphic display devices,[18] in the economy as a whole.

1. The patentability of computer programming should not depend on the draftsman's choice of "apparatus," rather than "process," format for the claims. Computer programs have been characterized, for the purpose of bringing them within the Patent Code's categories of "statutory subject matter," as coming within either of two well-established conceptual classifications of inventions.[19] The first is a new use of an old machine, which is a method or "process" under 35 U.S.C. 100(b).[20] Although respondent utilized the "process" format, he did not limit his

tems. Compare *Standard Industrial Codes* 3573 ("Electronic Computing Equipment") and 7372 ("Computer Programming and Other Software Services") (1972). With an estimated industry compound growth rate of between 15 percent and 20 percent per year, the 1975 dollar volume for the software services industry was more than $1.5 billion. *U.S. Service Industries in World Markets*, *supra*, at A–90, A–96.

[18] The idea claimed here is not limited to use in computer display systems. It is also applicable, although the claims do not refer to any such use, to the video telephone or "Picturephone." R. 9. Similarly, the legal principle involved in this case has significance going beyond the computer industry. At the very least, it affects the many other segments of the economy in which computers are utilized.

[19] 35 U.S.C. 101 permits the grant of patents only on inventions in one of the following categories of subject matter: machines, compositions of matter (*e.g.*, chemical compounds), articles of manufacture (*e.g.*, safety matches), and processes or methods for making or using one of the foregoing, and new and useful improvements of such categories.

[20] 35 U.S.C. 100(b) provides: "The term 'process' means process, art or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material."

claims to it.[21] The second possible characterization of a computer program is as a "new machine," consisting of the old digital computer said to be in some way transformed into a new computer by the new program controlling it. The claims for the program involved here are in this second form. Claim 10, for example, recites that it is for "apparatus"[22] having "programmed data processing means for" performing scan conversion (App. A, *infra,* p. 7A; R. 214).

The court below distinguished respondent's program from Benson's solely on the ground that the appealed claims were for an apparatus, rather than a process. The premise of the lower court's position is that a programmed computer is a new machine (which is patentable subject matter under Section 101) because it is "structurally different from a machine without that program" (App A, *infra,* p. 14A). But this is so only in the sense that a player piano can be said to become a "new" and "structurally different" machine when a new piano roll is inserted into it to make it play a new tune. Surely, this is a legal fiction[23] elevating form over

[21] The examiner's allowance of certain process claims, which preceded this Court's *Benson* decision, is not subject to direct review under present law. See note 13, *supra*, p. 8. Under the logic of the Board's decision, however, the allowed claims could not stand. By the same token, their allowance is inconsistent with the view of the law urged in this petition.

[22] "Apparatus" means "machine." Rich, J., dissenting in *Application of Chatfield*, *supra*, 545 F. 2d at 159–160.

[23] Judge Rich so observed, dissenting in *Application of Johnston*, 502 F. 2d 765, 773, (C.C.P.A.), reversed *sub nom. Dann* v. *Johnston*, 425 U.S. 219.

substance. Any competent patent draftsman can draft a claim for a computer program in "machine" terms as easily as in "method" (*i.e.*, "process") terms, or as easily as one might translate from French to English or from binary coded decimals to pure decimal or to pure binary numbers."[24] See *Benson, supra.*

Review of claim 10 (App. A, *infra,* p. 7A) of the instant patent application, for example, reveals that despite its "apparatus" language, it merely covers the steps of an algorithm for a program to be executed by means of a conventional general-purpose digital computer. The substance of the claim is simply a series of steps to be executed in order to define the points that are to be illuminated on a TV tube. The steps are described as "means" to perform the various steps, but the "means" needed are only the components of an ordinary general-purpose digital computer (App. A, *infra,* pp. 7A–8A).[25] The program is, at best, merely a new use of this existing machine (cf. 35 U.S.C. 100(b)) and should be no more patentable

[24] Indeed, respondent's allowed claim 11, on the same alleged invention as claims 9 and 10 (involved here) was cast in process format.

Judge Rich, in dissent in *Chatfield*, *supra*, 545 F. 2d, at 160, reiterated the point he had previously made, again in dissent, in *Johnston*, *supra*, 502 F. 2d at 772: "[G]iven an invention which is in essence a new program for a general-purpose digital computer, a competent patent draftsman can readily define the invention as either a process or a machine, or both. This has been demonstrated time and again by the computer program cases which have come to this court."

[25] In patent drafting, a claimed series of steps is deemed a "method" or "process." But a series of "means" adapted to perform such steps is deemed an "apparatus" or "machine."

when claimed as new apparatus than when claimed as a new process. Nothing in the decision below (which, indeed, appears to assume the opposite) suggests that these steps, if claimed as "steps" rather than as "means" to perform such steps, would be patentable subject matter.[26]

The respondent's sole inventive contribution, if any, is the idea of using a digital computer and program (instead of wired circuits) to convert numerical information or signals from x-y format to information or signals in sequential format, so that further signals can then be generated that are capable of use in a TV-tube to display the original information as a graph; the rest is all routine and conventional. The reliance of the court below on the purely formal, verbal distinction between method claims and machine claims begs the real question in this case—to which we now turn—whether this allegedly inventive contribution (however claimed) constitutes the kind of advance that is patentable under 35 U.S.C. 101.

2. Respondent's claims are so broad and abstract as to seek to patent an idea. What is patentable under 35 U.S.C. 101 is the specific and tangible application of scientific principles and ideas to a specific use, in which the idea is concretely embodied in a novel and inventive machine, article of manufacture, chemical

[26] We do not understand respondent to contend otherwise. At least, respondent has not hitherto sought to argue that his process claims could be upheld without overruling *Benson.* The similarity between the subject matter of respondent's data-processing steps (considered as "steps"—and thus a method) and Benson's is discussed *infra,* at pp. 19–20.

or other physical composition, or process for making or using such machinery, manufactures, or compositions. In implementing the Patent Clause of the Constitution (Article I, Section 8, clause 8) Congress concluded that, on balance, granting patent monopolies on ideas (however novel[27]) would hinder the free exchange and spread in use of mathematical and scientific concepts and thus obstruct, rather than promote, the progress of science and the useful arts. See *Benson, supra,* 409 U.S. at 67. This principle is not limited to mathematical formulas or algorithms; in *Benson* this Court listed "[p]henomena of nature, though just discovered, mental processes, and abstract intellectual concepts" as not patentable, because "they are the basic tools of scientific and technological work." 409 U.S. at 67; see *O'Reilly* v. *Morse* (the *Telegraph* case), 15 How. 62, 112–113.

To keep patent grants from preempting ideas, this Court has held that an idea's embodiment must be a specific and tangible application of the idea, in a con-

[27] For the purposes of this case, petitioner will assume that the respondent's idea of substituting digital computer programming for wired circuitry to perform the task of scan conversion is novel and useful, within the meaning of 35 U.S.C. 101–102. Petitioner does not here contend that the examiner or Board should have rejected the appealed claims as obvious over the prior art (*e.g.*, the Fenimore patent, see note 10, *supra*), within the meaning of 35 U.S.C. 103. Petitioner does contend, however, that insofar as the subject matter of the appealed claims is concerned respondent did not "invent or discover any * * * process [or] machine * * * or any * * * improvement thereof" on which a patent may lawfully be granted under Section 101 and the pertinent case law.

crete form.[28] In reviewing "the requirements of our prior precedents" on process patents in *Benson, supra,* 409 U.S. at 68–71, the Court illustrated the principle and showed its application to programming ideas. In one group of cases the requisite concreteness, and thus "the clue to the patentability of a process claim that does not include particular machines" (*id.* at 70), was supplied by the fact that the idea was a specific technique for transforming one particular physical substance into a different particular physical substance. When no transformations of physical substances were involved, however, as in cases concerning methods of sending information via telegraph or telephone, the requisite of concreteness was satisfied only when the monopoly was restricted to a specific end-use or technological art and was tied to "particular machines."[29]

[28] Similarly, business ideas (apart from their tangible applications) are unpatentable, because patents on methods of transacting business would be as destructive to competition as patents on scientific ideas would be destructive to scientific progress. See, *e.g.*, *Joseph E. Seagram & Sons, Inc.* v. *Marzall*, 180 F. 2d 26, 28 (C.A.D.C.) (method of testing consumer product preferences).

[29] In the *Telegraph* case, *supra*, the Court allowed Morse's claim for a process of using electromagnetism in a specified novel apparatus to produce signals for telegraphic use, but denied a claim for the general method of communicating by means of electromagnetism, because that would impermissibly extend the patent monopoly to cover a whole scientific principle. In *The Telephone Cases*, 126 U.S. 1, the Court allowed Bell's method claim for telephonic use of a similar principle, only because it was limited to the method as carried out with the "magnetic and variable resistance" mouthpiece devices.

Thus this Court refused to allow a patent monopoly on Benson's program for changing BCD information to binary information, because to do so would impermissibly "wholly pre-empt the mathematical formula and in practical effect would be a patent on the algorithm itself" (409 U.S. at 72). Benson had presumably conceived a meritorious and useful idea, a method that could be used in Bell's telephone switchboard systems (and in a great many other applications) to convert BCD digital information into pure binary digital information. But Benson's claims were not limited to telephone switchboard applications, or any other category of application that was narrower than the whole field of performing BCD-to-binary conversion in the course of "data processing." Moreover, the claims to the method were not limited to use in any specific new machinery devised to practice the method or to any more specific old machinery than general-purpose digital computers. Whatever limitations there were on the scope of Benson's claims were insubstantial and therefore insufficient to move the monopoly Benson sought far enough down the spectrum (from an unacceptable monopoly on the idea to an acceptably narrow monopoly on a concrete embodiment of the idea) so as to permit a patent grant.

The broad monopoly sought in the present case is quite similar to that which Benson sought.[20] Benson used a computer program to convert BCD data to binary data, while respondent uses a computer pro-

[20] Coincidentally, the real parties in interest are the same in both cases.

gram to convert binary x-y format data to binary sequential format data. As in the *Benson* case, respondent's claims are not tied to any particular technological art or end use, such as operation of a telephone, a steel mill, or an oil well survey device; rather, the claims cover any data processing use whatever, so long as it is desired to visualize the answers in graphic form,[21] which is to say that the claims are substantially as broad as the field of using computers.[22]

Nor are the claims tied to any specific implementing apparatus, other than to digital computers. But that is no practical limitation at all, because there is no other sensible use for a computer program for converting data from binary x-y format to binary sequential format. Indeed, as Judge Rich pointed out in his dissent in the companion *Chatfield* case, *supra*, respondent's (and Chatfield's) claims are no more "limited" than were Benson's, which similarly were "in fact limited to a method carried out in data-processing apparatus (including a 'reentrant shift register,' claim 8) and to 'A data processing method' (claim 13)" (545 F. 2d at 161). Since such restrictions to data-processing did not make Benson's method sufficiently concrete to avoid the rule against patenting ideas, the fact that the instant claims similarly refer to data-processing apparatus should not make them any more concrete or change the result here.

[21] Even the limitation to graphic display is not found in claims 9 and 10.

[22] Respondent also stated that application of the concept may be found in other fields, such as the video telephone (or "Picturephone"). R. 9.

There are two further reasons why respondent's subject matter is unpatentable. First, more than limitations to a particular apparatus or machinery, art or technology, or end use (cf. *Benson, supra,* 409 U.S. at 64) are necessary to make the application of even an unobvious idea patentable. The abstractness-concreteness principle, which separates unpatentable ideas and phenomena of nature from patentable embodiments, requires that the way in which the patent applicant implements his innovation (whether claimed as a process or method, composition of matter, article of manufacture, or machine) must itself be inventive. See, *e.g., Funk Brothers Seed Co.* v. *Kalo Inoculant Co.*, 333 U.S. 127, 130; *Armour Pharmaceutical Co.* v. *Richardson-Merrill, Inc.*, 396 F. 2d 70, 73–74 (C.A. 3); *National Lead Co.* v. *Western Lead Products Co.*, 324 F. 2d 539, 542 (C.A. 9); *Davison Chemical Corp.* v. *Joliet Chemicals, Inc.*, 179 F. 2d 793, 794–795 (C.A. 7), certiorari denied, 340 U.S. 816; *Loew's Drive-In Theatres, Inc.* v. *Park-In Theatres, Inc.*, 174 F. 2d 547, 551–552 (C.A. 1), certiorari denied, 338 U.S. 822.[33] In each of these cases, the court held that no patent should have been granted, because there was no invention in devising the claimed embodiment once the patentee had possession of the idea (which was unpatentable as such).

Similarly, it is well established that a machine is not patentable if it is a combination of old parts that co-operate or co-act with one another in the conven-

[33] See also *Benson, supra,* 409 U.S. at 67–68.

tional way such parts have in the past co-acted. Instead, the totality of parts must "result in an effect greater than the sum of the several effects taken separately." *Anderson's-Black Rock, Inc.* v. *Pavement Co.*, 396 U.S. 57, 61; see *Sakraida* v. *Ag Pro, Inc.*, 425 U.S. 273; *Deepsouth Packing Co.* v. *Laitram Corp.*, 406 U.S. 518, 521–522. Without this effect, there is no invention—not only for the purposes of 35 U.S.C. 103 relating to the prior art, but also for those of 35 U.S.C. 101, which requires that the applicant "invent or discover" the allegedly new and useful product or process claimed, for it to be statutory subject matter.[34]

Respondent's idea was to accomplish the conversion of data from x-y format to sequential format by computer programming, so that the data could be conveniently converted into analog signals to be displayed on the TV-tube display device. This is the operation that the hardware or wired apparatus disclosed in the Fenimore patent had previously accomplished. Even if it is assumed (n. 10, *supra,* p. 8) that there is "discovery" in using a program to control a general-purpose digital computer to accomplish this task, nonetheless there is neither any inventiveness in the programming implementation (as *Funk* requires) nor

[34] One may "discover" a phenomenon of nature (see *Benson, supra,* 409 U.S. at 67, so stating) or "invent" an abstract intellectual concept (as Morse invented the concept of transmitting messages by electromagnetism, held unpatentable in the *Telegraph* case, *supra*), and yet not be entitled to a patent monopoly on the "discovery" or "invention," because it is not the kind of discovery or invention that the law permits anyone to monopolize even for a limited time.

any "greater effect" (as *Anderson's-Black Rock* requires) between or among the parts of the "computer graphics system" claimed here. To the contrary, the actual programming implementation was a straightforward application of conventional data-processing techniques; respondent does not claim otherwise, and, indeed, expressly stated that the scan conversion procedure can be implemented by "straightforward, elementary (one might even say trivial) programming techniques" (R. 49).

Nor is there any novel and unconventional cooperation between the computer program and the existing machinery. The program is simply another conventional use for an ordinary computer, and all of the parts of the system function separately and together in the ordinary way such parts normally function. Whether the respondent's system is viewed as a method of using the computer or as a new apparatus, there is no new interaction between the new programming idea and the old digital computer that could transmute the mere idea or the computer into something else tangible and concrete enough to justify foreclosing the use of the idea to the public. *Graham* v. *John Deere Co.*, 383 U.S. 1, 8–9.

In sum, the respondent's programming idea, as claimed here, lacks the elements of concreteness that supply reasonable metes and bounds for a patent monopoly, and it also lacks an inventive implementation. The patent sought is thus one on the idea itself. If there should be broader or special protection for

such programming ideas, it is for Congress rather than the court below to fashion it.

CONCLUSION

For the foregoing reasons, the petition for a writ of certiorari should be granted.

Respectfully submitted.

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MAY 1977.

234-280—77——4

APPENDIX A

United States Court of Customs and Patent Appeals

APPLICATION OF A. MICHAEL NOLL

PATENT APPEAL No. 74-541

November 18, 1976

Before MARKEY, Chief Judge, and RICH, BALDWIN, LANE and MILLER, Associate Judges

BALDWIN, *Judge:* This is an appeal from the decision of the Patent and Trademark Office (PTO) Board of Appeals (board sustaining the rejecting of claims 2, 7, 8, 9, and 10 of appellants application for "Raster Scan Computer Graphics System."[1] Claims 1, 4, 5, 6, 11, 12, and 13 stand allowed. We reverse.

THE INVENTION

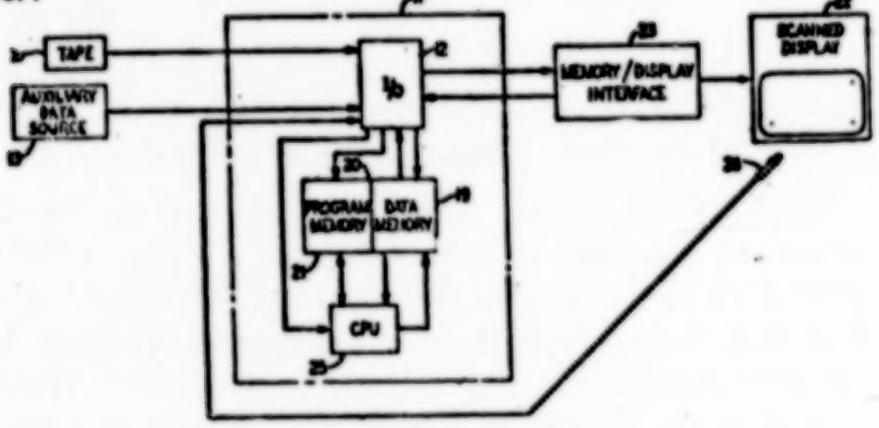
The invention relates to a system and apparatus for the display of text or other graphical information on a device such as a cathode ray tube. The data to be displayed are supplied by a computer or similar source in "point-plotting" format in which each element (point, line, character, etc.) is individually specified. The output display device is of the raster-scan or television-like format where a picture is reproduced by selective energization of a repetitively scanned beam. The system involves scan-converting the point-specifying input data into a form suitable for storage in a dot-matrix format for subsequent readout and presentation to the output display device.

---

[1] Serial No. 8,831, filed February 5, 1970.

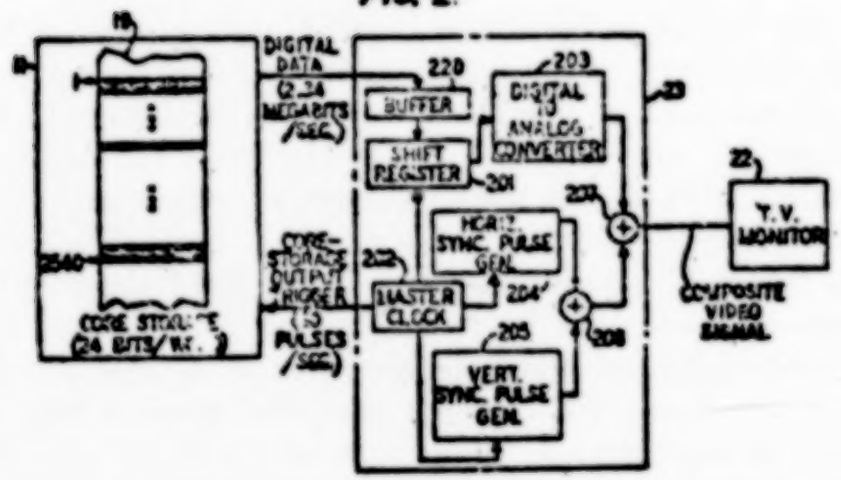
The system disclosed in the application is illustrated in Figs. 1 and 2 thereof, reproduced below. The hardware is not disclosed as being novel *per se*; indeed, various components such as computer 11, scanned display 22, and light pen 26 are described as being well known in the art.

FIG. 1



1. Serial No. 8,831, filed February 5, 1970.

FIG. 2



Referring to Fig. 1, the data to be displayed are supplied from the tape 10 or auxiliary data source

13. They include representations of the rectangular Cartesian (x, y) coordinates of the points represented. Such data are fed to general purpose digital computer 11, which is operated under the control of a program stored in its program memory 21 to scan-convert the data from point-plotting format to a dot-matrix format in the computer memory 19. The specification discloses that the computer 11 is a well-known general purpose computer and that the Honeywell DDP–224 computer is especially well adapted for scan-conversion.

Binary to analog conversion of the scan-converted data is performed in memory display interface device 23, illustrated diagrammatically in Fig. 2. Here, horizontal and vertical pulse generators 204 and 205 are triggered by pulses from master clock 202 and their output passes through analog "OR" circuit 206 to provide a portion of the composite video signal for scanned display device 22 in Fig. 1 (shown as a T.V. monitor device 22 in Fig. 2). Shift register 201 receives scan-converted words from the computer memory and applies them to digital-to-analog converter 203 to supply signals combined with the output of the digital-to-analog converter in analog "OR" circuit 207 to form the composite video signal. That signal has "the usual characteristics associated with signals supplied to commercial or other television receivers" and results in the illumination of such points in the raster of the tube screen as will graphically represent the original input data.

Item 26 in Fig. 1 is described as a light pen "of standard design" that is "used to provide an indication to computer 11 of the desire by an operator to delete or modify information displayed on display device 22."

Appellant's specification refers to previously used techniques for scan-conversion, including one described in United States patent No. 3,293,614, issued December 20, 1966, to Fenimore et al. This patent discloses a graphic display system in which scan-conversion is achieved by hardwired apparatus. Appellant noted in an amendment [2] to his application:

> Scan conversion, as such, is not new. The concept of establishing, by some means, a dot matrix of the general type used in the present invention is not new. What is new is the claimed data processing method and apparatus for producing the exact functions claimed in claim 1. The detailed functioning is described in the present specification; the programming to accomplish each individual operation specified is obvious to an ordinary skilled worker in the field.

In the same amendment, appellant states that, instead of using specialized (hardwired) circuitry as in the Fenimore system, he employs a "programmable data processor operating under the control of a program" in the scan-conversion. Appellant emphasizes that complete program control with its attendant flexibility distinguishes his invention from the hardwired systems of the prior art.

THE CLAIMS

Allowed claim 1, appealed claims 2, 7, and 8, dependent on claim 1, and appealed claims 9 and 10 are reproduced below:

ALLOWED CLAIM

1. A computer graphics system for displaying in a multi-line, multi-point-per-line format

[2] Filed in the PTO on March 10, 1971.

images corresponding to a sequence of input display commands comprising

(A) a programmable data processor operating under the control of a program to convert said display commands into data entries in an array of multi-bit data words, each entry is said array corresponding to a discrete point in the image to be displayed,

(B) a scanned-raster display device for generating illuminated points on a display surface in response to applied data signals and

(C) means intermediate said data processor and said display device and cooperating with said data processor for sequentially accessing said words in said array for presentation to said display device.

APPEALED CLAIMS

2. Apparatus according to claim 1 wherein said program controlled data processor comprises

(1) a memory storing data signals including program control signals and said array of data words, and,

(2) processing means responsive to said program control signals stored in said memory for

(a) interpreting input display commands,

(b) converting said input display commands into location signals for controlling the storage of corresponding digital signals in said array, and

(c) selectively reading data from said array, said means for selectively reading also being responsive to signals from said intermediate means.

7. Apparatus according to claim 1 further comprising

(1) storage means adapted to receive data words from said array, said storage means being further adapted to sequentially read out consecutive bit sequences, each of which bit sequences corresponds to a point in said image,

(2) a light sensitive device for generating a pulse output signal corresponding to a selected one of said illuminated points on said display surface,

(3) programmed data processing means for generating location signals identifying the multi-bit data word most recently transferred from said array to said storage means, and

(4) means responsive to said location signals and said pulse output signal for generating signals identifying approximately said one of said illuminated points.

8. Apparatus according to claim 7 further comprising programmed counter means for generating signals corresponding to the number of said bit sequences which have been read from said most recently transferred data word.

9. Apparatus for scan converting a sequence of first data signals each corresponding to x and y coordinates of a point on an M-line, P-point-per-line display surface into a sequence of corresponding second signals, comprising

(I) a plurality of N-bit storage devices, and

(II) programmed data processing means for

(A) interpreting each of said first data signals to extract the specified x and y coordinate information,

(B) generating address signals identifying a location in said N-bit storage devices for each of said sequence of first data signals in response to said x and y information, and

(C) generating and storing the corresponding one of said second sequence of signals in the N-bit storage location specified by said address signals.

10. Apparatus according to claim 9 wherein said programmed data processing means further comprises means for

(1) multiplying said y coordinate by P to form first product signals,

(2) adding said x coordinate to said first product signals to form first sum signals,

(3) dividing said first sum by N to form

(a) a quotient signal corresponding to the address of the appropriate N-bit storage location, and

(b) a remainder signal corresponding to the bit position in said appropriate N-bit storage location at which said corresponding one of said second sequence of signals is to be stored.

Although all claims on appeal recite structures in "means for" language, we note that many of the "structures" called for in the claims are part of the computer as configured to carry out appellant's scan-conversion program. This is most readily observed in claim 10 and can be found to a lesser, but significant, extent in the remaining claims on appeal.

THE SECTION 112 REJECTION

The examiner, in the final rejection, rejected claims 2 and 7–9[3] "as based upon inadequate disclosure."

---

[3] Claim 10 was merely objected to as dependent on a rejected claim. It was grouped with the rejected claims in an Advisory Action, dated August 30, 1971, without explanation.

He said:

> For example, in claim 2, the applicant is claiming processing means comprising a first means, second means, and means for selectively reading data. However, it is not clear from the specification what structure supports the claimed means.
>
> It is not enough to simply cite the Honeywell DDP–224 Computer as adequate support. To establish this precedent would allow an applicant to claim in means plus function language a multitude of computer functions, even to the extent of claiming the DDP–224 Computer itself with little or no supporting structure.
>
> It is presumed that applicant will argue that he is not claiming the DDP–224 or any part of it, but rather is claiming structure that is conditioned in the DDP–224 by the insertion and operation of the program. Even conceding, however, that different structure is conditioned in the computer by the program, the vital question is still: what is the structure?
>
> Claim 1 is adequately supported since element A calls for a programmable data processor and sufficient flow charts and citation of a specific general purpose computer support this element as part of a combination claim. Presumably, this claim will not read on special purpose apparatus performing the same function as element A (this appears to be the distinction over the Fenimore reference), since the applicant has specifically claimed a data processor operating under control of a program.
>
> Claim 2, however, attempts to extend claim 1 to specific apparatus contained in the data processor. Therefore, the applicant must show structural support for his claim.

> In short, what is the different structure that is conditioned by the operation of the program in the Honeywell Computer. Without knowing the specific structure, it is impractical to determine the metes and bounds of the claim. One would have to translate the program steps into structural cooperation in the computer. This requires a detailed analysis of the computer structure during the running of a program and a specification of what particular structure supports the claimed means.
>
> This burden of determining the structure to support the claims should fall on the applicant. Similarly, claim 7 calls for programmed data processing means and means responsive to location signals. Since claim 1 already calls for a programmed processor, the claim to a programmed data processing means is assumed to be an attempt to incorporate specific structure, unless the applicant intends to add another programmed processor to the combination of claim 1. Similar remarks can be made as to claim 8 and claim 9.

In response, appellant, *inter alia,* amended claims 7 and 9 "to recite only a single programmed processor having a plurality of functions." The above criticism of claims 7–9 was not thereafter repeated. In his brief before the board, appellant stated:

> The sole substantial issue to be decided upon the instant appeal is whether apparatus claims may be amply supported in the sense of 35 USC 112, paragraph 1, by a disclosure which is admittedly sufficient for teaching one to practice the corresponding method on a programmed digital computer. That is, given that there is a sufficient disclosure to permit one of ordinary skill in the art to program and operate a gen-

> eral purpose digital computer to perform specified functions, may apparatus claims directed to means for performing these functions issue based on this disclosure?

The examiner, in his Answer, agreed with appellant's statement of the issue, except to note that "apparatus claims must comply with 35 USC 112 paragraph 3[sic 2?] as well as 35 USC 112 paragraph 1." However, he stated that the "sole ground of rejection" was the failure to disclose the detailed internal structure of the computer so programmed. He went on to say:

> [A]pparatus claims need apparatus support. To determine what particular apparatus supports the program during its execution requires analysis and translation of the program-hardware combination. * * * It is the Examiner's contention that in order to determine this precise structural support for the claimed functions (and thus be able to delineate the metes and bounds of the claim), the burden of analysis and translation should be on the Appellant and not on the public.

The board incorporated the examiner's remarks by reference and further commented:

> [W]e find ourselves in agreement with the examiner, whose remarks with regard to the claims under rejection found in the final rejection and answer, we incorporate by reference. Viewed for what they are, namely apparatus claims, claims 2 and 7 through 9 require supporting disclosure. An inspection of the drawings and the specification leaves us ignorant as to what configuration of elements, electrical or otherwise, go to make up the device which will, for example, perform the steps identified as (a), (b) and (c) used to characterize the "processing means" in claim 2. As the examiner has indicated in his answer, the public in whose name the patent is granted, and in particular those members of the public who do not wish to infringe it are entitled to know the nature of the support for such claims. The claims are for apparatus and we do not think that the public is provided such information where disclosure critical to the claimed subject matter is supported only by a computer program with its attendant computer.

THE SECTION 101 REJECTION

A majority of the board, acting under 37 CFR 1.196(b), also rejected the appealed claims under 35 U.S.C. § 101 [4] for being directed to non-statutory subject matter, citing *Gottschalk* v. *Benson*, 409 U.S. 63, 93 S. Ct. 253, 34 L. Ed. 2d 273, 175 USPQ 673 (1972). The majority stated:

> Although appellant in the case at bar has couched the claims under consideration by us in apparatus form, it seems clear by the language in the specification * * * and in his brief * * * that he perceives his invention, in fact to lie in the computer program disclosed. If we may paraphrase Gertrude Stein, "a program is a program is a program." Where the only mode of practicing an invention is disclosed by way of a computer program, whether apparatus or method claims are presented, appears to us to be immaterial as to the legal effect. To allow an applicant to secure patent protection by apparatus claims to subject mat-

[4] 35 U.S.C. § 101 reads: "Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title."

> ter, the only disclosure for which is an equivalent computer program, after the decision in the *Benson* et al. case would be, in our opinion, to allow him to do by indirection what the Supreme Court has indicated he should not be allowed to do directly, e.g., obtain protection of the computer program as such.

The third member of the board declined to enter into this new ground of rejection and indicated that it would be better to remand the case to the examiner for consideration of this rejection in light of *Benson* (decided after the Examiner's Answer) and recent decisions of this court.

Opinion

THE SECTION 101 REJECTION

Unlike the method claims in *In re Chatfield,* Cust. & Pat.App., 545 F. 2d 152, (CCPA 1976), decided this date, appellant's claims are drawn to *apparatus* for scan-converting a sequence of first data signals into a sequence of second signals. This apparatus is a "machine" or an "improvement thereof" within the meaning of 35 U.S.C. § 101.

[1, 2] It is the *claims* which define the invention. The instant claims describe an apparatus, *not* a program. The solicitor and the board cite various instances in the record which allegedly indicate that the appellant "perceives his invention, in fact to lie in the computer program disclosed." How appellant "perceives his invention" is irrelevant to a rejection under 35 U.S.C. § 101, which merely lists the so-called statutory classes of subject matter. Moreover, neither the board nor the solicitor may extract that part of the claimed invention which *they* deem to be novel

and test only that part to determine whether it belongs to one of the statutory classes of patentable subject matter. It is the *claimed subject matter as a whole* which must be subjected to this test. This court has stated in *In re Bernhart,* 417 F. 2d 1395, 1399, 57 CCPA 737, 743, 163 USPQ 611, 615–16 (1969):

> If, in an invention defined by a claim, the novelty is indicated by an expression which does not itself fit in a statutory class (in this case not a machine or a part thereof), then the whole invention is nonstatutory since all else in the claim is old. We do not believe this view is correct under the Patent Act and the case law thus far developed.

We realize that claims may be drafted in the *form* of one of the statutory classes but in *substance* be directed to non-statutory subject matter. Such was the case in *Gottschalk* v. *Benson,* supra, where claims to a method for converting binary-coded decimal number representations into binary number representations were held to be unpatentable because directed to non-statutory subject matter.

In *Benson* the Supreme Court considered the claimed method to be too abstract and too sweeping, "a generalized formulation for programs to solve mathematical problems," 409 U.S. at 65, 93 S. Ct. at 254, 175 USPQ at 674. The Court noted that "[t]he claims were not limited to any particular art or technology, to any particular apparatus or machinery, or to any particular end use." 409 U.S. at 64, 93 S. Ct. at 254, 175 USPQ at 674. Indeed, the Court pointed out that the claimed method could even be performed "without a computer." The Court believed that the grant of the claims at issue in *Benson* would, in effect, "be a patent on the algorithm itself."

[3] The instant claims, however, are drawn to physical structure and not to an abstract "law of nature, a mathematical formula, or an algorithm." *In re Johnston,* 502 F. 2d 765, 771, 183, USPQ 172, 177 (CCPA 1974), *rev'd on other grounds,* 425 U.S. 219, 96 S. Ct. 1393, 47 L. Ed. 2d 692, 189 USPQ 257 (1976). There is nothing abstract about the claimed invention. It comprises physical structure, including storage devices and electrical components uniquely configured to perform specified functions through the physical properties of electrical circuits to achieve controlled results. Appellant's programmed machine is structurally different from a machine without that program. It thus broadly corresponds to the combination held to be statutory subject matter in claim 18[5] in *In re Bernhart,* supra.

Unlike the invention claimed in *Benson,* the instant claims are limited to a particular technology (computer graphics systems and scan-conversion of graphic information). Furthermore, not all machines for achieving appellant's results are included within

[5] Claim 18 in *Bernhart* reads: "A system for providing a planar illustration of a three dimensional object as seen by an observer from a selected observation point in space comprising: signal means providing a first group of signals representing the three dimensional co-ordinates of the location of the observation point and a series of second groups of signals representing the three dimensional coordinates of a series of points of the object, each of said group of signals being referenced to a first co-ordinate system; electronic digital signal processing means coupled with said signal means and programmed to provide a series of third groups of signals corresponding to the two dimensional co-ordinates of the intersection of each line of sight from the observation point to each point of the object with a selected plane in said first coordinate system; and planar illustration means coupled with said signal processing means and responsive to said series of third groups of signals to provide a planar illustration of the object."

the scope of appellant's claims; non-program-controlled machines are clearly excluded. Therefore, we need not and do not decide whether computer programs *per se* constitute statutory subject matter.

We realize that the Supreme Court's opinion in *Benson* contains language interpreted by the board as standing for a general proscription on the patenting of computer programs under 35 U.S.C. § 101.[6] However, in that very opinion, the Court stated:

> "It is said that the decision precludes a patent for any program servicing a computer. We do not so hold. [409 U.S. at 71, 93 S.Ct. at 257, 175 USPQ at 676.]

[6] The Court in *Benson* stated:

> "If these programs are to be patentable, considerable problems are raised which only committees of Congress can manage, for broad powers of investigation are needed, including hearings which canvass the wide variety of views which those operating in this field entertain." [409 U.S. at 73, 93 S.Ct. at 258, 175 USPQ at 677, footnote omitted.]

However, "these programs" refers to the specific type of claimed program involved in *Benson* and not to computer programs in general, as evidenced by the Court's preceding statements (409 U.S. at 71–72, 93 S.Ct. at 257, 175 USPQ at 676–77):

> "It is conceded that one may not patent an idea. But in practical effect that would be the result if the formula for converting [binary-coded decimal] numerals to pure binary numerals were patented in this case. The mathematical formula involved here has no substantial practical application except in connection with a digital computer, which means that if the judgment below is affirmed, the patent would wholly pre-empt the mathematical formula and in practical effect would be a patent on the algorithm itself.
>
> "It may be that the patent laws should be extended to cover *these programs*, a policy matter to which we are not competent to speak. The President's Commission on the Patent System rejected the proposal that *these programs* be patentable * * *" [Italics added and footnotes omitted.]

Judge Rich, in his dissenting opinion in *In re Johnston,* supra, asked the Supreme Court to set the limits on *Benson:*

> I deem it to be the Supreme Court's prerogative to set the limits on *Benson,* which was broadly based. I hope it will do so. [502 F. 2d at 774, 183 USPQ at 179.]

In its review of *Johnston,* the Supreme Court, referring to its opinion in *Benson,* emphasized that *Benson* was a *limited* holding.[7]

We conclude that *Benson* must be limited to method claims such as those presented in that case. Accordingly, the rejection of claims 2 and 7 through 10 under 35 U.S.C. § 101 is *reversed.*

THE SECTION 112 REJECTION

In our view, the thrust of the § 112 rejection is that appellant has failed to disclose the detailed internal structure of the computer as programmed. We agree with the solicitor that this is the same rejection as that involved in *In re Comstock,* 481 F. 2d 905, 178 USPQ 616 (CCPA 1973), and *In re Knowlton,* 481 F. 2d 1357, 178 USPQ 486 (CCPA 1973), and that "[t]hose cases, of course, dispose of any enablement question here."[8] The solicitor therefore relies only on 35 U.S.C. § 112, second paragraph.

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[7] As we observed, "[t]he claims were not limited to any particular art or technology, to any particular apparatus or machinery, or to any particular end use." * * * Our *limited holding* * * * was that respondent's method was not a patentable "process" as that term is defined in 35 U.S.C. § 100(b). [425 U.S. at 224, 96 S.Ct. at 1396, 189 USPQ at 259. Italics supplied and footnote omitted.]

[8] Solicitor's brief at p. 3. Similarly, at oral hearing the solicitor said, "I'm here today arguing indefiniteness. I would rather forget about the first paragraph involvement."

[4–6] There is language in the rejection phrased by the examiner and the board, although not as clear as it could have been, providing the basis for a 35 U.S.C. § 112, second paragraph, rejection. That rejection, however, as we implied in *In re Johnston,* supra, cannot stand where there is adequate description in the specification to satisfy 35 U.S.C. § 112, first paragraph, regarding means-plus-function recitations in the claims that are not, *per se,* challenged for being unclear. Footnote 11 in *Johnston* states:

> The solicitor argues that the board had another basis for its indefiniteness rejection, namely that the means-plus-function recitations in the claims are indefinite for lack of any corresponding descriptions of structure in the specification upon which the scope of equivalents might be based in accordance with the third paragraph of § 112.
>
> However we cannot agree with the solicitor that the board set forth any such basis for its "indefiniteness" rejection. Furthermore, the thrust of this proposed rejection indicates that it would have been properly made under the *first* paragraph of § 112. See *In re Comstock,* 481 F. 2d 905, 178 USPQ 616 (CCPA 1973), *In re Knowlton,* supra. See also *In re Bernhart,* supra. [502 F. 2d at 770, 183 USPQ at 176. Italics in original.]

The claims in the instant case encompass the means described in the specification, *i.e.,* the specified programmed general purpose computer, and equivalents thereof. The meaning of "equivalents" is well understood in patent law, *Graver Tank & Mfg. Co.* v. *Linde Air Products Co.,* 339 U.S. 605, 70 S. Ct. 854, 94 L. Ed. 1097, 85 USPQ 328 (1950), and an applicant need not describe in his specification the full range of

equivalents of his invention, some of which may be nonexistent at the time the application is filed.

Accordingly, the rejection of claims 2 and 7 through 10 under 35 U.S.C. § 112 is reversed.

REVERSED.

LANE, *Judge,* dissenting, with whom RICH, *Judge,* joins.

With deference, I cannot agree with the majority opinion in either its result or the underlying reasoning supporting its result. I would affirm the decision of the board rejecting claims 2, 7, 8, 9, and 10 under section 101. Since I would affirm the section 101 rejection, I find no need to consider the propriety of the examiner's rejection under section 112.

At the outset, I note specific portions of the record and briefs which clearly demonstrate to me that the appealed claims indeed cover programming, albeit disguised in apparatus format. The majority has already noted the amendment filed on March 10, 1971, wherein appellant emphasized that complete program control distinguishes his invention from the hardwired systems of the prior art, such as the Fenimore system. In the specification, abstract of the invention, appellant states:

> A computer graphics system is described which includes *a programmed computer for scan converting* point-specifying data into a form suitable for storage in a dot matrix format, and for controlling subsequent sequential (or other) readout and presentation of such data to a television-like scanned display device. [My italics.]

The specification later discloses:

> [T]hat the scan conversion is performed by computer program methods thereby permitting

> a considerable degree of freedom in selecting system parameters * * *.

In his main brief before the board, appellant stated the following:

> Thus the issue is raised squarely as to whether the identification of a programmable data processor and a disclosure of a program sufficient to enable one to program the programmable data processor is sufficient to enable one to practice an invention directed to a combination of means for performing the functions of the programmable data processor.
>
> * * * * *
>
> By way of contrast, it is well to note that applicant regards any such detailed disclosure of the logic circuity and memory of a computer conditioned by the appropriate programs to not be the best mode of practicing the claimed invention. In fact, it is well known that one of the principal purposes for which most modern programmable processes [sic] have been designed is ease of programming. Thus it is desired that it not be necessary for a programmer to understand the fundamental internal circuit details of the computer.
>
> * * * * *
>
> Nowhere in the instant application are (non-programmed) modifications to standard programmable machines required to practice the claimed invention, i.e., applicant in the instant application has only directed that the identified computer be appropriately programmed.

Finally, appellant's reply brief before us states:

> [A]ppellant's *novel program* is loaded and executed in the cited general purpose computer. [My italics.]

I agree with the board majority that the claims here on appeal are properly rejected under section

101 in light of *Gottschalk* v. *Benson,* 409 U.S. 63, 93 S. Ct. 253, 34 L. Ed. 2d 273, 175 USPQ 673 (1972). In that case, the Supreme Court held that the method claims before it [1] were directed to non-statutory sub-

[1] Claims 8 and 13 of *Benson* read:

"8. The method of converting signals from binary coded decimal form into binary which comprises the steps of—

"(1) storing the binary coded decimal signals in a reentrant shift register,

"(2) shifting the signals to the right by at least three places, until there is a binary '1' in the second position of said register,

"(3) masking out said binary '1' in said second position of said register,

"(4) adding a binary '1' to the first position of said register,

"(5) shifting the signals to the left by two positions,

"(6) adding a '1' to said first position, and

"(7) shifting the signals to the right by at least three positions in preparation for a succeeding binary '1' in the second position of said register.

"13. A data processing method for converting binary coded decimal number representations into binary number representations comprising the steps of—

"(1) testing each binary digit position i, beginning with the least significant binary digit position, of the most significant decimal digit representation for a binary '0' or a binary '1';

"(2) if a binary '0' is detected, repeating step (1) for the next least significant binary digit position of said most significant decimal digit representation;

"(3) if a binary '1' is detected adding a binary '1' at the (i+1)th and (i+3)th least significant binary digit positions of the next lesser significant decimal digit representation and repeating step (1) for the next least significant binary digit position of said most significant decimal digit representation;

"(4) upon exhausting the binary digit positions of said most significant decimal digit representation, repeating steps (1) through (3) for the next lesser significant decimal digit representation as modified by the previous execution of steps (1) through (3); and

"(5) repeating steps (1) through (4) until the second least significant decimal digit representation has been so processed."

ject matter under section 101. Although the opinion in *Benson* is subject to differing, conflicting interpretations with respect to whether it represents a general proscription on the patenting of computer programs under section 101, I conclude that it does. I draw this conclusion from the following language in *Benson,* 409 U.S. at 73, 93 S. Ct. at 258, 175 USPQ at 677:

> If these programs are to be patentable,[6] considerable problems are raised which only committees of Congress can manage, for broad powers of investigation are needed, including hearings which canvass the wide variety of views which those operating in this field entertain. The technological problems tendered in the many briefs before us [7] indicate to us that considered action by the Congress is needed.

[6] See Wild, Computer Program Protection: The Need to Legislate a Solution, 54 Corn. L.Rev. 586, 604–609 (1969); Bender, Computer Programs: Should They be Patentable, 68 Col. L. Rev. 241 (1968); Buckman, Protection of Proprietory Interest in Computer Programs, 51 J. Pat. Off. Soc'y 135 (1969).

[7] Amicus briefs of 14 interested groups have been filed in this case.

The reference to "these programs" in the above quote can only be to computer programs in general as discussed in the immediately preceding paragraph of the opinion, particularly where the Court quotes from the *Report of the President's Commission on the Patent System* (1966). This view is further reinforced by the Court's reference to several articles discussing the problems associated with the patenting of computer programs in general.

Although the holding of the Court in *Benson* may have been narrower than the above quoted language suggests, thus perhaps relegating that quoted language to the status of dicta, nevertheless the dicta

remain as an indication of the Court's thinking in this area, which we would be well advised to heed. In this regard, I cannot agree with the majority's reliance on terse, cryptic excerpts found in *Benson* and in *Dann* v. *Johnston*, 425 U.S. 219, 96 S. Ct. 1393, 47 L. Ed. 2d 692, 189 USPQ 257 (1976)[2] which allegedly undercut any broad construction of *Benson*. On the contrary, I believe that *Benson* has broad ramifications.

Having concluded that *Benson* represents a general proscription on the patenting of computer programs under section 101, I turn to the claims before us to see whether they fall within this proscription. As acknowledged by the majority, all claims on appeal contain, at least in part, apparatus limitations which are internal structures of the claimed computer as configured to carry out appellant's scan conversion program. The issue, then, is whether casting program limitations in apparatus format renders *Benson* inapplicable to the claims on appeal. I believe not. Merely because the instant claims are in apparatus rather than method format does not, in my opinion, distinguish from *Benson*. Indeed, narrowly limiting *Benson* to method claims would permit and invite circumvention of that decision by the facile drafting device of claiming in apparatus form an idea for programming computers that would, according to my understanding of *Benson*, be unpatentable subject

[2] In *Benson:* It is said that the decision precludes a patent for any program servicing a computer. We do not so hold. [409 U.S. at 71, 93 S. Ct. at 257, 175 USPQ at 676.]

In *Dann* v. *Johnston:* Our limited holding [in *Benson*] * * * was that respondent's method was not a patentable "process" as that term is defined in 35 U.S.C. § 100(b). [425 U.S. at 224, 96 S. Ct. at 1396, 189 USPQ at 259. Footnote omitted.]

matter if claimed as a method.[3] Such results would be anomalous.

The majority relies heavily upon this court's 3–2 ruling in *In re Johnston*, 502 F. 2d 765, 183 USPQ 172 (CCPA 1974), *rev'd on other grounds*, 425 U.S. 219, 96 S. Ct. 1393, 47 L. Ed. 2d 692, 189 USPQ 257 (1976), which viewed record-keeping machine systems defined by apparatus claims as being statutory subject matter under section 101. *Benson* was there distinguished by narrowly limiting it to method claims, not applicable to the apparatus type of claims then before us:

> Furthermore, the instant claims, in *apparatus* form, do not claim or encompass a law of nature, a mathematical formula, or an algorithm. [502 F. 2d at 771, 183 USPQ at 177, italics in original.]

Upon careful review of *Johnston*, however, I am not convinced that the distinction set forth therein between method and apparatus claims is completely sound. Certainly, the distinction between method and apparatus claims developed in *Johnston* is open to question where an applicant has merely claimed an otherwise proscribed computer program in "means for" language. Moreover, the Court in *Benson* failed

[3] I note in passing the following material quoted by the Court in *Benson*, which is taken from the *Report of the President's Commission on the Patent System* (1966): "Uncertainty now exists as to whether the statute permits a valid patent to be granted on programs. Direct attempts to patent programs have been rejected on the ground of nonstatutory subject matter. Indirect attempts to obtain patents and avoid the rejection, by drafting claims as a process, or a machine or components thereof programmed in a given manner, rather than as a program itself, have confused the issue further and should not be permitted. [409 U.S. at 72, 175 USPQ at 677.]

to draw any distinction between claim 13 (note 1, supra), which recited a method devoid of any apparatus, and claim 8 (note 1, supra), which recited a method employing a specific piece of apparatus, holding both unpatentable under section 101. Clearly, if the apparatus used in the method of *Benson* claim 8 did not take the invention defined therein out of a general proscription against patenting programs in whatever form claimed, then similarly the apparatus format of the claims here on appeal does not make these claims, which cover programming, claims to statutory subject matter.

APPENDIX B

United States Court of Customs and Patent Appeals

MANDATE—NO. 74-541

IN THE MATTER OF THE APPLICATION OF

A. MICHAEL NOLL

SERIAL NO. 8,831—NOVEMBER 18, 1976

On appeal from the Board of Appeals; This Cause having been heard and considered, it is Ordered and Adjudged: Reversed.

A true copy, certified this 10th day of December, 1976.

GEORGE E. HUTCHINSON, *Clerk*,
U.S. Court of Customs and Patent Appeals.

APPENDIX C

Opinion and Decision of Board of Appeals,

June 22, 1973

Before ANDREWS and BENNETT, Examiners-in-Chief, and BURNS, Acting Examiner-in-Chief

BURNS, *Acting Examiner-in-Chief:* This is an appeal from the final rejection of claims 2 and 7 through 10. Claims 1, 4 through 6, and 11 through 13 stand allowed. Claim 3 has been objected to as depending from a rejected independent claim.

The disclosure relates to a computer controlled display system. Input data signals, otherwise formatted than for raster scan, are processed by a digital computer under program control to produce a display on a cathode ray tube having a raster scan. The digital processing as disclosed by appellant is performed by a Honeywell DDP–224 computer programmed in accordance with a program for which flow charts are provided in the disclosure.

Claim 2 depends from allowed claim 1 and we, accordingly, reproduce both of these claims as representative of the subject matter.

> 1. (allowed) A computer graphics system for displaying in a multi-line, multi-point-per-line format images corresponding to a sequence of input display commands comprising
>
> (A) a programmable data processor operating under the control of a program to convert said display commands into data entries in an array of multi-bit data

words, each entry in said array corresponding to a discrete point in the image to be displayed,

(B) a scanned-raster display device for generating illuminated points on a display surface in response to applied data signals and

(C) means intermediate said data processor and said display device and cooperating with said data processor for sequentially accessing said words in said array for presentation to said display device.

2. (at bar) Apparatus according to claim 1 wherein said program controlled data processor comprises

(1) a memory storing data signals including program control signals and said array of data words, and,

(2) processing means responsive to said program control signals stored in said memory for

(a) interpreting input display commands,

(b) converting said input display commands into location signals for controlling the storage of corresponding digital signals in said array, and

(c) selectively reading data from said array, said means for selectively reading also being responsive to signals from said intermediate means.

The examiner has rejected claims 2 and 7 through 10 upon the single ground that, under 35 U.S.C. 112, these claims are based upon an inadequate disclosure.

Whereas the examiner has indicated independent claim 1 as allowable for which he finds sufficient flow charts and the citation of a specific general purpose computer as support for element A in claim 1, he holds that the language of claim 2 attempts to extend

the subject matter of claim 1 to specific apparatus contained in the data processor for which no structural support is shown. He urges that "one would have to translate the program steps into structural cooperation in the computer", requiring a detailed analysis of the computer structure during the running of the program with a specification of what particular structure therein supports the claimed means. The burden of this determination, he indicates, should fall upon the appellant.

In his brief, appellant has stated the issues to be decided in this case with which statement the examiner indicates his agreement. We quote appellant's brief:

> The sole substantial issue to be decided upon the instant appeal is whether apparatus claims may be amply supported in the sense of 35 U.S.C. 112, paragraph 1, by a disclosure which is admittedly sufficient for teaching one to practice the corresponding method on a programmed digital computer. That is, given that there is a sufficient disclosure to permit one of ordinary skill in the art to program and operate a general purpose digital computer to perform specified functions, may apparatus claims directed to means for performing these functions issue based on this disclosure?

Appellant urges that as regards the internal structure of the general purpose computer during the practicing of the invention, neither appellant nor one skilled in the art would know or care how such structure was configured. Even if the computer and its program were analyzed to determine what gates, flip-flops, memory elements, etc. enter into a particular cooperative relationship during execution of the program, it is maintained that depending upon the previous execution history, even for an identical computer,

the exact gates and the like may not be the same. On page 8 of his brief, paragraphs 2 and 3, appellant indicates that any such detailed disclosure of the logic circuitry and memory of a computer conditioned by the appropriate programs is not in his opinion the best mode of practicing a claimed invention. If we understand him correctly, he deems his best mode to involve the use of a computer program.

After careful consideration of the arguments advanced in appellant's briefs together with the answer and the final rejection, we find ourselves in agreement with the examiner, whose remarks with regard to the claims under rejection found in the final rejection and answer, we incorporate by reference. Viewed for what they are, namely, apparatus claims, claims 2 and 7 through 9 require supporting disclosure. An inspection of the drawings and the specification leaves us ignorant as to what configuration of elements, electrical or otherwise, go to make up the device which will, for example, perform the steps identified as (a), (b) and (c) used to characterize the "processing means" in claim 2. As the examiner has indicated in his answer, the public in whose name the patent is granted, and in particular those members of the public who do not wish to infringe it are entitled to know the nature of the support for such claims. The claims are for apparatus and we do not think that the public is provided such information where disclosure critical to the claimed subject matter is supported only by a computer program with its attendant computer. Accordingly, we will sustain the rejection.

In so doing, we are mindful that our remarks may have a bearing upon claim 1 inasmuch as the substance of that claim as an independent claim is

incorporated by reference in claim 2. However, claim 1 is not before us.

Under the provisions of Rule 196(b) we enter the following rejection:

Claims 2 and 7 through 10 are rejected under the provisions of 35 USC 101 as being directed to non-statutory subject matter. Since the filing of the reply brief in the instant case, the case of *Gottschalk, Cmr. Pats.* v. *Benson et al.*, 175 USPQ 673, has been decided. In that case, the United States Supreme Court made the following statement:

> The mathematic formula involved here has no substantial practical application except in connection with a digital computer, which means that if the judgment below is affirmed, the patent would wholly pre-empt the mathematic formula and in practical effect would be a patent on the algorithm itself.

Although appellant in the case at bar has couched the claims under consideration by us in apparatus form, it seems clear by the language in the specification, page 5, summary of the invention, and in his brief, in particular, page 4, second full paragraph and page 8, second full paragraph that he perceives his invention, in fact to lie in the computer program disclosed. If we may paraphrase Gertrude Stein, "a program is a program is a program." Where the only mode of pricing an invention is disclosed by way of a computer program whether apparatus or method claims are presented, appears to us to be immaterial as to the legal effect. To allow an applicant to secure patent protection by apparatus claims to subject matter, the only disclosure for which is an equivalent computer program, after the decision in the Benson et al. case would be, in our opinion, to

allow him to do by indirection what the Supreme Court has indicated he should not be allowed to do directly, e.g. obtain protection of the computer program as such. The decision of the examiner is affirmed.

Any request for rehearing or reconsideration or modification of this decision by the Board of Appeals based upon the same record must be filed within thirty days from the date of the decision. (Rule 197). Should appellant elect to have further prosecution before the examiner in response to the new rejection under Rule 196(b) by way of amendment or showing of facts, or both, not previously of record, a shortened statutory period for making such response is hereby set to expire *thirty days* from the date of this decision.

D. D. ANDREWS,
Examiner-in-Chief,
Board of Appeals.

WALTER W. BURNS, Jr.,
Examiner-in-Chief (Acting),
Board of Appeals.

BENNETT, Examiner-in-Chief, concurring:

With the decision of the majority as to the insufficient disclosure rejection, I fully concur. I agree that there is insufficient disclosure.

I do not choose to enter into the 196(b) rejection in this case because I am of the opinion that to do so would be poor judicial practice. In my opinion, we can reach a better result by remanding this case to the examiner and giving him the opportunity to review the application in the light of recent decisions

both of the Supreme Court of the United States and decisions of the United States Court of Customs and Patent Appeals.

The application of the Benson et al. decision, cited above, to apparatus claims is filled with difficulties. Out of respect for both the examining corps and patent bar, I am of the opinion that they should develop this issue and that we should objectively review their conclusions.

R. D. BENNETT,
Examiner-in-Chief,
Board of Appeals.

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